



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 2  
290 BROADWAY  
NEW YORK, NY 10007-1866



1167261

16 September 2010

Dr. Bradley C. Williams, Ph.D.  
HDR  
One Blue Hill Plaza, Floor 12  
Pearl River, NY 10965

**SENT VIA EMAILED PDF**

Dear Dr. Williams:

I have enclosed Work Assignment Number 019-RICO-08BC, Region 8 Libby Asbestos – OU#8 - RI/FS. In accordance with clause B.4 (c) your firm is required to return a signed copy of the work assignment form (first page only and you may send it via an emailed PDF), to the undersigned, within five working days after receipt.

The expenditure ceilings are not to be exceeded without advance approval of the Contracting Officer.

If you have any questions, please contact me at (212) 637-3363.

Sincerely,

A handwritten signature in black ink, appearing to read "John J. Bachmann, Jr.", written over a horizontal line.

John J. Bachmann, Jr.  
Contracting Officer

cc: K. Moncino  
R. Thomas  
WA File

**EPA**United States Environmental Protection Agency  
Washington, DC 20460**Work Assignment**

Work Assignment Number

019-RICO-08BC

☐ Other ☐ Amendment Number:

Contract Number

EP-W-09-009

Contract Period 03/05/2009 To 03/04/2014

Base X

Option Period Number

Title of Work Assignment/SF Site Name

Region 8 Libby Asbestos - OU#8

Contractor

HENNINGSON DURHAM &amp; RICHARDSON PC

Specify Section and paragraph of Contract SOW

III. A. Fund-Lead Site Specific

Purpose:



Work Assignment



Work Assignment Close-Out



Work Assignment Amendment



Incremental Funding

Period of Performance

From 09/16/2010 To 12/30/2011

Comments:

The purpose of this action is to initiate a new work assignment under this contract. Attached to this Work Assignment Form is the Statement of Work for this assignment. The initial expenditure limit shall be allocated to Task 1 - Project Planning activities.

☒ Superfund

## Accounting and Appropriations Data

☐ Non-SuperfundSFO  
(Max 2)

22

Note: To report additional accounting and appropriations data use EPA Form 1900-69A.

Line	DCN (Max 6)	Budget/FY (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount (Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1	LSP834	10	T	R2B	302DD2C	2505	50000		08LRABC	C001
2										
3										
4										
5										

## Authorized Work Assignment Ceiling

Contract Period:

03/05/2009 To 03/04/2014

Cost/Fee: \$0.00

LOE: 0

This Action:

\$50,000.00

250

Total:

\$50,000.00

250

## Work Plan / Cost Estimate Approvals

Contractor WP Dated:

03/04/2014

Cost/Fee: \$0.00

LOE: 0

Cumulative Approved:

Cost/Fee: \$50,000.00

LOE: 250

Work Assignment Manager Name Rebecca Thomas

Branch/Mail Code:

Phone Number 303-312-6552

FAX Number:

(Signature)

(Date)

Project Officer Name Keith Moncino

Branch/Mail Code:

Phone Number: 212-637-4353

FAX Number:

(Signature)

(Date)

Other Agency Official Name

Branch/Mail Code:

Phone Number:

FAX Number:

(Signature)

(Date)

Contracting Official Name John J. Bachmann Jr.

Branch/Mail Code:

Phone Number: 212-637-3363

FAX Number:

(Signature)

(Date)

9/16/10

**STATEMENT OF WORK**  
**REMEDIAL INVESTIGATION/FEASIBILITY STUDY**  
**Libby Asbestos Superfund Site**  
**Operable Unit 8, State Highways**  
**Libby and Troy, Montana**  
**Contract No: EP-W-09-009**

**PURPOSE**

The purpose of this work assignment is to conduct a remedial investigation/feasibility study (RI/FS) at Operable Unit 8 (State Highways) of the Libby Asbestos Superfund Site to select a remedy that eliminates, reduces, or controls risks to human health and the environment. Specifically, the RI/FS involves the investigation and study of asbestos contamination in soil, road base, and, for limited areas of Highway 37, asphalt. This statement of work (SOW) sets forth the framework and requirements for this effort. The goal is to evaluate data already collected to support the selection of an approach for site remediation and then to use this data to result in a well-supported Record of Decision (ROD). The estimated completion date for this work assignment is December 2011.

**SITE DESCRIPTION**

Operable Unit 8 of the Libby Asbestos Superfund Site is comprised of 5 Highway segments in Libby and Troy Montana. These segments include State Highways 2 and 37, as well as secondary highways 567 (Pipe Creek), 260 (River Road), and 482 (Farm-to-Market). Streets and alleys in Libby and Troy will be addressed separately, as necessary, and are not a subject of this work assignment.

**GENERAL REQUIREMENTS**

The contractor shall conduct the RI/FS in accordance with this SOW and all other relevant guidance used by EPA in conducting an RI/FS. The Work Assignment Manager for this work assignment is Rebecca Thomas. She can be reached at (303) 312-6552, or via e-mail at [thomas.rebecca@epa.gov](mailto:thomas.rebecca@epa.gov). Her mailing address is Rebecca Thomas (EPR-SR), U.S. EPA Region 8, 1595 Wynkoop St., Denver, Colorado 80202.

A summary of the major deliverables and a suggested schedule for submittals is attached.

The contractor shall furnish all necessary and appropriate personnel, materials, and services needed for, or incidental to, performing and completing the RI/FS. In all cases, the contractor shall use the most recently issued guidance.

EPA will review deliverables to determine whether the requirements of this work assignment have been met, and to assess the likelihood that the RI/FS will achieve its goals. Acceptance of deliverables by EPA does not relieve the contractor of responsibility for the adequacy of the deliverables.

## **GREEN REMEDIATION**

Green remediation is the practice of considering all environmental effects of remedy implementation and incorporating options to maximize the net environmental benefit of cleanup actions. In accordance with EPA's strategic plan for compliance and environmental stewardship, the Agency strives for cleanup programs that use natural resources and energy efficiently, reduce negative impacts on the environment, minimize or eliminate pollution at its source, and reduce waste to the maximum extent possible. EPA supports the adoption of "green site assessment and remediation", which can be defined as the practice of considering all environmental impacts of remedy studies, selection and implementation, and incorporating strategies to maximize the net environmental benefit or cleanup actions (refer to <http://www.clu-in.org/greenremediation>).

To the extent practicable and/or feasible, the contractor shall explore and implement green remediation strategies for work assignments under this contract to maximize sustainability, reduce energy and water usage, promote carbon neutrality, promote industrial materials reuse and recycling, protect and preserve land resources through green applications. The contractor shall present green remediation options and approaches in the work plans, provide a cost analysis for these options in the work plan budgets, maintain records of green related activities, and report this information to EPA as needed.

The contractor can also refer to the following documents, checklists, and guidance to assist with understanding and implementing Green Remediation practices:

- "Green Remediation Practices" Attachment 1
- EPA Region 2 – "Green Site Assessment and Remediation Checklist Superfund Remedial Investigation/Feasibility Study Activities" Attachment 2
- Remedial Action Contract (RAC) Toolkit – U.S. EPA OSWER Office of Superfund and Remediation Technology Innovation  
(Go to [http://www.clu-in.org/greenremediation/docs/RAC\\_Toolkit.pdf](http://www.clu-in.org/greenremediation/docs/RAC_Toolkit.pdf))
- Executive Order 13423 – Strengthening Federal Environmental, Energy, and Transportation Management (Jan. 2007). (Go to: <http://www.epa.gov/oaintmnt/practices/eo13423.htm>)
- Federal Acquisition Requirement, FAR Part 23 – Environment, Energy and Water Efficiency, Renewable Energy Technologies, Occupational Safety, and Drug-Free Workplace. (In particular, FAR 23.2, 23.4, and 23.7) (Go to <http://www.arnet.gov/far/05-23-1/html/FARTOCP23.html>)

## **SUBMISSION OF DELIVERABLES**

The contractor shall maintain all technical and financial records for the RI/FS in accordance with the contract. At the completion of the RI/FS, the contractor shall submit three bound copies of the official record of the RI/FS Report, and one copy of the major deliverables in electronic format (Word, Excel, and PDF, where appropriate) to the EPA Records Manager in accordance with the requirements of the contract. Technical and financial records must be able to support decisions made during the RI/FS as well as during cost recovery.

## **PROJECT CLOSEOUT**

At the completion of this work assignment, the contractor shall perform all necessary project closeout activities as specified in the contract. These activities may include closing out any subcontracts, indexing and consolidating project records and files as required and providing a technical and financial closeout report to EPA. Final costs shall be reported to EPA broken down into the cost for each element of the Work Breakdown Structure (WBS) identified in this SOW.

### **TASK 1      Project Planning and Support**

#### **1.1 Project Administration**

The contractor shall provide the project administration and management support in the performance of this work assignment.

#### **1.2 Scoping Meeting**

The contractor shall contact the EPA WAM within five calendar days after receipt of the work assignment to schedule the scoping meeting to be held via conference call. It is anticipated that two (2) contractor personnel will attend the scoping meeting. The contractor shall provide the EPA with meeting minutes from the scoping meeting within five (5) calendar days after the actual scoping meeting.

#### **1.3 Conduct Site Visit**

Not Applicable

#### **1.4 Develop Draft Work Plan and Associated Budget**

The contractor shall prepare and submit an RI/FS work plan and budget in accordance with contract requirements. The contractor shall use appropriate EPA guidance as the basis for preparing the RI/FS work plan and budget. The work plan shall include a description of implementation activities, performance monitoring, and overall management strategy, including optimization, for the RI/FS.

The RI/FS work plan shall include a comprehensive description of project tasks, the procedures to accomplish them, project documentation, and project schedule.

#### **1.5 Negotiate Final Work Plan/and Associated Budget**

The contractor shall attend a work plan negotiation meeting via tele-conference. The contractor shall submit a final work plan and budget incorporating the agreements made in the negotiation meeting. The final work plan shall include a summary of the negotiations. The contractor shall submit the revised work plan and budget in both hard copy and electronic formats.

## 1.6 Evaluate Existing Data and Documents

The contractor shall evaluate existing site background information. The contractor shall obtain, copy (as necessary), and review available information pertaining to the site provided as identified by the EPA WAM, including, but not limited to:

Site Specific Health and Safety Plan – supplied by EPA-WAM

## 1.7 Quality Assurance Project Plan

Not Applicable

## 1.8 Health and Safety Plan

Not Applicable

## 1.9 Non-RAS Analyses

Not Applicable

## 1.10 Meetings

The contractor shall participate in progress and technical meetings during the course of the work assignment. For budgeting purposes, the contractor shall assume 6 meetings (conference calls or in Region 8 Denver office) throughout the period of performance for this work assignment, with two people in attendance, with each meeting lasting approximately two hours. For budgeting purposes, the contractor shall assume they will prepare and submit meeting minutes for these meetings. The minutes shall be submitted to EPA within 5 days after meeting.

## 1.11 Subcontract Procurement

Not Applicable

## 1.12 Perform Subcontract Management

Not Applicable

## 1.13 Pathway Analysis Report (PAR)

Not Applicable

# **TASK 2      COMMUNITY INVOLVEMENT**

## 2.1 Community Interviews

Not Applicable

## 2.2 Community Involvement Plan

Not Applicable

### 2.3 Public Meeting Support

- Prepare Draft and Final Public Meeting Visual Aids. The contractor shall develop draft visual aids (i.e., power point slides, poster boards, and handouts). For budgeting purposes, the contractor shall assume 15 slides and 50 sets of handouts for one public meeting. The contractor shall develop final visual aids incorporating all modifications to address EPA review comments. EPA will identify and obtain the meeting location.
- The contractor shall provide a court reporter for the public meeting. The contractor shall deliver to the EPA WAM a full-page original and a "four on one" page copy, along with an electronic copy of the transcripts for each hearing.

### 2.4 Fact Sheet Preparation

EPA will provide HDR with an approved CIP. The contractor shall prepare draft fact sheets in accordance with the approved CIP for the site. The contractor shall draft, format, edit, provide graphics, and lay out for each fact sheet. The contractor shall prepare final fact sheets incorporating all comments received from the EPA WAM on the draft fact sheet. The first fact sheet will be for the Remedial Investigation; the second fact sheet will be for the Feasibility Study.

### 2.5 Proposed Plan Support

The contractor shall provide administrative and technical support for the preparation of the draft and final Proposed Plan describing the preferred alternative and other alternatives evaluated in the FS. The Proposed Plan shall be prepared in accordance with the NCP and the EPA Superfund Community Involvement Handbook (most current version), and all other applicable EPA guidance. EPA will provide the text; the contractor shall format, edit, provide graphics, lay out, and copy the fact sheets. The proposed plan will be approximately 10 pages in length with 5 illustrations and 1000 copies will be required.

The contractor shall prepare the final Proposed Plan incorporating all comments received from the EPA WAM on the draft Proposed Plan. After EPA approval of the final Proposed Plan, the contractor shall copy and attach mailing labels to the Proposed Plan and deliver mailing-ready copies to EPA Region 8 offices in Denver, Colorado. EPA will mail the Proposed Plan from their office in Denver, Colorado.

### 2.6 Public Notices

The contractor shall place public notices in local newspapers serving the site community. Assume one public notice for one public meeting to be published in 4 newspapers of local circulation.

### 2.7 Information Repositories

Not Applicable

### 2.8 Site Mailing List

Not Applicable

## 2.9 Responsiveness Summary Support

The contractor shall provide administrative and technical support for the Responsiveness Summary for the OU8 Proposed Plan. The contractor shall provide assistance in compiling and summarizing comments received during the public comment period on the Proposed Plan. The contractor shall provide technical support in developing responses to comments as requested by the EPA WAM. For budgeting purposes, the contractor shall assume 50 separate comments (including duplicate comments).

**TASK 3      FIELD INVESTIGATION/DATA ACQUISITION - Provided by EPA.**

**TASK 4      SAMPLE ANALYSIS - Provided by EPA.**

**TASK 5      ANALYTICAL SUPPORT AND DATA – Provided by EPA.**

**TASK 6      DATA EVALUATION - Provided by EPA**

**TASK 7      RISK ASSESSMENT - Not Applicable**

The risk assessment will be conducted by EPA and provided to the contractor for incorporation into the RI/FS.

**TASK 8      TREATABILITY STUDY/PILOT TESTING - Not Applicable**

**TASK 9      REMEDIAL INVESTIGATION REPORT**

The contractor shall prepare the RI report based upon data provided by EPA. The RI shall provide information to assess risks to human health and to support the development, evaluation, and selection of appropriate response alternatives. The task includes all draft and final reports. The RI report shall be written in accordance with Guidance for Conducting Remedial Investigations/Feasibility Studies under CERCLA, OSWER Directive 9355.3-01, October 1988, Interim Final (or latest revision) and Guidance for Data Usability in Risk Assessment, (EPA/540/G-90/008), October 1990 (or latest revision).

### 9.1 Draft RI Report

In accordance with the schedule developed in the RI/FS work plan, the contractor shall submit a draft RI Report which includes the following:

1) Executive Summary

2) Introduction

- a) Purpose of the Report
- b) Site Background



- i) Site Description
- ii) Site History
- iii) Previous Investigations
- iv) Previous Emergency or Interim Actions
- v) Report Organization

**3) Study Area Investigation**

- a) Includes field activities associated with site characterization, including as appropriate physical and chemical monitoring of the following:
  - i) Surface Features (e.g.; topographic mapping, natural and manmade features)
  - ii) Field Investigation and technical approach
  - iii) Chemical analyses and analytical methods
  - iv) Field methodology
- b) If technical memoranda documenting field activities were prepared, they may be included in an appendix and summarized in this report chapter.

**4) Physical Characteristics of the Study Area**

- a) Includes the results of field activities to determine physical characteristics, including as appropriate the following:
  - i) Surface Features
  - ii) Meteorology
  - iii) Hydrogeology
  - iv) Geology
  - v) Hydrogeology
  - vi) Demography and Land use
  - vii) Reuse Assessment
  - viii) Ecological Assessment

**5) Nature and Extent of Contamination - Screening values used to determine nature and extent shall be agreed upon by EPA before issuing the draft RI.**

- a) Presents the results of site characterization, both natural and chemical components and contaminants as appropriate in the following media:
  - i) Contaminant Sources
  - ii) Contaminant distribution and trends

**6) Contaminant Fate and Transport**

- a) Potential Routes of Migration (e.g.; air, ground water, soils)
- b) Contaminant Persistence
  - i) As applicable, describe estimated persistence in the study area environment and physical, chemical, and/or biological factors of importance for the media of interest
- c) Contaminant Migration
  - i) Discuss factors affecting contaminant migration for the media of interest (e.g.; sorption onto soils, solubility in water, movement of ground water, etc.)
  - ii) Discuss modeling methods and results if applicable

**7) Baseline Risk Assessment – provided by EPA**

## 8) Summary and Conclusions

- a) Summary
  - i) Nature and Extent of Contamination
  - ii) Fate and Transport
  - iii) Risk Assessment

## 9) Conclusions

- a) Data Limitations and Recommendations for Future Work
- b) Recommended Remedial Action Objectives

## 10) References

## 11) Tables and Figures

12) Appendices (i.e., log books, soil boring logs, test pit/trenching logs, monitoring well construction diagrams, private and public well records, analytical data and QA/QC evaluation results)

### 9.2 Final RI Report

After EPA review of the draft RI Report, the contractor shall incorporate EPA comments and submit the final RI Report.

## **TASK 10      REMEDIAL ALTERNATIVES SCREENING - Not Applicable**

## **TASK 11      REMEDIAL ALTERNATIVES EVALUATION**

Assess individual alternatives against each of the nine evaluation criteria and perform a comparative analysis of all options against the evaluation criteria. The analysis shall be consistent with the NCP, 40 CFR Part 300 and shall consider the Guidance for Conducting Remedial Investigation and Feasibility Studies under CERCLA (OSWER Directive 9355.3-01), Guide to Developing and Documenting Cost Estimates During the Feasibility Study (OSWER Directive 9355.0-75), and other pertinent OSWER guidance. The analysis will include institutional controls (ICs) to the extent appropriate. EPA will make the determination regarding final selection of the remedial alternative.

The nine criteria to be employed in evaluation of remedial alternatives are:

- 1) Overall protection of human health and the environment
- 2) Compliance with applicable or relevant and appropriate requirements (ARARs)
- 3) Long-term effectiveness and permanence
- 4) Reduction in toxicity, mobility or volume through treatment
- 5) Short-term effectiveness
- 6) Implementability - technical and administrative
- 7) Cost
- 8) State acceptance
- 9) Community acceptance.

### 11.1 Draft Technical Memorandum

The contractor shall prepare a draft tech memo which addresses the following: (1) a technical description of each alternative that outlines the waste management strategy involved and identifies the key ARARs associated with each alternative; and (2) a discussion that profiles the performance of that alternative with respect to each of the evaluation criteria. The contractor shall provide a table summarizing the results of this analysis. Once the individual analysis is complete, the alternatives will be compared and contrasted to one another with respect to each of the evaluation criteria.

### 11.2 Final Technical Memorandum

After EPA review of the draft Technical Memorandum, the contractor shall incorporate EPA comments and submit the final Technical Memorandum.

## **TASK 12      FEASIBILITY STUDY REPORT**

The Contractor shall develop a Feasibility (FS) Report consisting of a detailed analysis of alternatives and cost-effectiveness analysis in accordance with the most recent guidance.

### 12.1 Draft FS Report

The contractor shall prepare a draft FS report and submit to EPA according to the schedule in the RI/FS work plan. To expedite the development of the FS report, the contractor shall, at a minimum, communicate weekly (telephone calls or electronic mail messages) with EPA to discuss the progress of the report and shall provide draft chapters of the FS report for review as they are developed.

The FS Report shall contain the following:

- Feasibility Study Objectives
- Remedial Objectives
- General Response Actions
- Identification and Screening of Remedial Technologies
- Remedial Alternatives Description
- Detailed Analysis of Remedial Alternatives (individual and comparative)
- Summary and Conclusions

### 12.2 Final FS Report

After EPA review of the draft FS Report, the contractor shall incorporate EPA comments and submit the final FS Report.

### **TASK 13 POST RI/FS SUPPORT**

- 13.1 Provide support required for preparation of the ROD for the site. The final recommendation contained in the ROD shall represent the opinion and recommendation of EPA, not that of the contractor. For budgeting purposes, the contractor shall assume 80 LOE for this task.
- Provide technical assistance in preparing the Responsiveness Summary
  - Provide technical assistance in preparing the Proposed Plan and ROD

### **TASK 14 ADMINISTRATIVE RECORD - Not Applicable**

### **TASK 15 CLOSEOUT**

Upon notification from EPA, that the technical work under the work assignment is complete, the contractor shall perform the necessary activities to close out this work assignment in accordance with contract requirements.

#### **15.1 Work Assignment Closeout Report (WACR)**

The contractor shall prepare a Work Assignment Closeout Report (WACR). The WACR shall include all LOE by p-level and costs in accordance with the WBS.

#### **15.2 Document Indexing**

The contractor shall organize the work assignment files in their possession in accordance with the current approved EPA file index structure [e.g., Administrative Record Index, EPA Superfund Site File Index, and/or ARCS Guidelines for Closeout of Work Assignment (June 1991)]. For the Superfund program, Section 113(k)(1) of CERCLA as amended by SARA, requires EPA to establish an Administrative Record (AR) which contains all the information the Agency considers in selecting a response action. The AR for the selection of a remedial action or response decision must be made available for public inspection at the commencement of the remedial investigation phase (when the RI/FS work plan is approved).

#### **15.3 Document Retention/Conversion**

The contractor shall convert all relevant paper files into an appropriate long-term storage format. EPA will define the long term storage format prior to the closeout of the work assignment.

**Attachment 1**  
**Summary of Major Submittals for Operable Unit 8, State Highways**  
**Libby Asbestos Superfund Site**

<b>TASK</b>	<b>DELIVERABLE</b>	<b>NO. OF COPIES</b>	<b>DUE DATE</b>
1.4	Draft Work Plan	3	45 days after receipt of assignment
1.5	Final Work Plan	3	15 days after negotiation
9.1	Draft RI Report	2	120 days after work plan approval
9.1	Final RI Report	3	30 days after receipt of EPA final comments
11.1	Draft Technical Memorandum	2	14 days after submission of RI report under task 9.2
11.2	Final Technical Memorandum	2	7 days after receipt of EPA final comments
12	Draft Feasibility Study	2	60 days after submission of RI report under task 9.2
12	Final Feasibility Study	3	30 days after receipt of EPA final comments

## ATTACHMENT 1 "GREEN REMEDIATION" PRACTICES

This attachment describes EPA Region 2's current basic guidelines for the contractor's evaluation and implementation of "Green Remediation" practices in the performance of remedial activities under work assignments issued for this contract. In the performance of these remedial activities, the contractor shall, to the extent practicable, explore and evaluate the use of:

**Clean Air**, through the use of cleaner technology and engines, cleaner fuel and cleaner diesel control technology on all diesel equipment used at sites during the remedial work. Clean diesel technologies are preferred, and alternative fuels such as biodiesel or natural gas-powered vehicles should also be considered. The contractor shall use alternative fuels, of at least a B20 blend or higher, on all on-site diesel equipment where these fuels are available within a reasonable distance from the site. The contractor shall employ the most efficient emission control technology for reducing particulate matter (PM) emissions on non-road and on-road diesel powered equipment used at a site. The contractor shall use cleaner engines, which include non-road engines meeting Tier II or cleaner standards and on-road engines meeting 2004 "On-Highway Heavy Duty Engine Emissions Standards" or cleaner.

**Renewable Energy Sources**, when conducting work related to selection of a cleanup remedy, constructing a cleanup remedy, and upgrading or otherwise improving an existing cleanup remedy. These sources of renewable energy can include solar, wind, and biofuels. Examples of renewable energy technologies include photovoltaic panels, wind turbines, digesters, gasifiers, and microturbines. As part of evaluating renewable energy sources and technologies, the contractor shall perform cost analyses that compare the energy costs from renewable sources to costs from traditional electricity sources provided by local utilities, over the expected life of the cleanup remedy. The contractor shall also perform evaluations of the emissions prevented as a result of using renewable energy sources versus traditional energy sources provided by local utilities. Finally, the contractor shall evaluate the costs of purchasing "green power" from organizations that offer such green power within the state where the site is located.

**"GreenScapes,"** as a cost-efficient and environmentally friendly solution for site landscaping. The "Greenscapes" concept has been designed to help preserve natural resources and prevent waste and pollution, and encourages practitioners to make more comprehensive decisions regarding waste generation and disposal and their associated cost and environmental effects on land, water, air, and energy use. "GreenScaping" encompasses a set of landscaping practices that can improve the health and appearance of the landscape at a site while protecting and preserving natural resources by reducing or eliminating the amount of waste materials involved in groundskeeping and the amount of water, pesticides, fuels, oils, and other materials used in landscaping. The practices involved in "GreenScaping" to reduce landscaping costs include: 1) Reducing the production of waste to promote more efficient use of materials; 2) Reusing materials in order to prolong their useful life and delay their recycling and/or final disposal; 3) Recycling to minimize waste generation by recovering and reprocessing usable products that might otherwise be disposed of; and 4) "Rebuying" by making purchases that meet project needs but have a better overall effect on the environment, such as biobased, recycled content, and other environmentally preferable elements. (For more information on "GreenScapes," see [www.epa.gov/osw/partnerships/greenscapes/index.htm](http://www.epa.gov/osw/partnerships/greenscapes/index.htm).)

**Industrial Materials Reuse (IMR)**, involving reusing or recycling byproduct materials generated from industrial processes that can be used as substitutions for raw materials in the manufacture of consumer products, roads, bridges, buildings, and other construction projects. For example, nonhazardous industrial materials, such as coal ash, foundry sand, construction and demolition materials, slag, and gypsum, are valuable products of industrial processes that can be recycled in a variety of diverse applications. These materials have many of the same chemical and physical properties as the virgin materials they replace, and in many cases can even improve the quality of a product. Putting these commodities into productive use can save resources and energy and reduce greenhouse gas emissions. As such, the reuse and recycling of industrial materials is preferred when applicable, and may even present opportunities for revenue generation to offset remedial costs. (For more information on Industrial Materials Reuse, see [www.epa.gov/osw/conserve/rrr/imr/index.htm](http://www.epa.gov/osw/conserve/rrr/imr/index.htm).)

**Attachment #2 –**  
**EPA Region 2 - Green Site Assessment and Remediation Checklist**  
**Superfund Remedial Investigation/Feasibility Study Activities**

In accordance with EPA's strategic plan for compliance and environmental stewardship, the Agency strives for cleanup programs that use natural resources and energy efficiently, reduce negative impacts on the environment, minimize or eliminate pollution at its source, and reduce waste to the greatest extent possible. The EPA Region 2 Superfund Program supports the adoption of "green site assessment and remediation," which can be defined as the practice of considering all environmental effects of remedy selection and implementation, and incorporating strategies to maximize the net environmental benefit of cleanup actions.<sup>1</sup> This definition encompasses each phase of a project, from investigation through remediation and restoration. Opportunities to green a project exist through consideration of the following key variables.<sup>2</sup>

- Water Use
- Land Use
- Energy Use
- Land Use/Ecosystem Impact
- Materials Use and Waste Produced
- Long-term Maintenance

An optimal phase in which to start considering these actions is during the Remedial Investigation/Feasibility Study (RI/FS) phase of a cleanup. Best practices of green remediation can be incorporated throughout the RI/FS phase, and, to maximize sustainability, cleanup and reuse options should be considered early during the planning process, enabling best practices to carry forward to cleanup activities, redevelopment activities, and ultimate land reuse. Incorporation of green remediation strategies into cleanup procurement documents and site management plans helps to open the door for best practices in the field. In accordance with federal procurement policy, selection of cleanup equipment and services must meet a project's performance and cost requirements, while giving preference to green products and providers.<sup>3, 4</sup>

Best practices of green remediation help ensure that day-to-day operations during all cleanup phases maximize opportunities to preserve and conserve natural resources, while achieving the cleanup's mission of protecting human health and the environment. Each site should incorporate practices addressing core elements of green remediation, with periodic review and update as new opportunities arise. An adaptive approach to managing all phases of a site cleanup enables the site to transition directly into long-term stewardship status. Each site should outline site-specific procedures to, among other things:

- Reduce air emissions and energy use,
- Demonstrate water-quality preservation and resource conservation,
- Establish near-term improvements to the ecosystem that carry forward into site revitalization, and
- Reduce material consumption and waste generation.

This checklist is designed to assist EPA contractors and Remedial Project Managers in planning for and implementing green practices during the RI/FS. Future checklists will provide guidance during the remedy implementation, restoration, and long-term maintenance phases.

## ADMINISTRATIVE

- **Incorporate green remediation practices into the contracting process, as possible**
  - ☐ Require the use of innovative approaches during the RI
  - ☐ Require contractors follow Region 2's Clean and Green Policy
  - ☐ Suggest contractors consider green remediation best practices during RI/FS
- **Consider future use at beginning of project to guide investigation and remedy selection**
  - ☐ Future use may guide type of sampling required; ensure that it most efficient and green method
  - ☐ Encourage development of renewable energy production facilities on contaminated lands
- **Reporting and Communication**
  - ☐ Interim and final documents should be submitted in digital rather than hardcopy format, unless otherwise requested by EPA, in an effort to save paper. This is especially applicable to voluminous data reports, such as the validation metadata for laboratory analyses.

## GENERAL ON-SITE OPERATIONS

- **Encourage sustainable practices in trailers/buildings**
  - ☐ Utilize existing building for field office if possible
  - ☐ Situate trailer to benefit from existing vegetation
  - ☐ Utilize "green" trailers if possible <sup>5, 6</sup>
  - ☐ Maintain heating and cooling systems
  - ☐ Enhance indoor environmental quality <sup>7</sup>
  - ☐ Optimize operational and maintenance practices to increase efficiency <sup>8</sup>
- **Minimize non-renewable energy consumption <sup>9, 10, 11, 12, 13</sup>**
  - ☐ Purchase renewable energy supply through local utility programs
  - ☐ Purchase Renewable Energy Credits/Certificates (RECs or Green Tags)
  - ☐ Research potential for Green Pricing Programs and Power Purchase
  - ☐ Utilize renewable Onsite Generation Systems, e.g., solar photovoltaic (PV), wind turbines, and biomass combustion
- **Use environmentally preferable products**
  - ☐ Compact Fluorescent Lights (CFL)
  - ☐ Environmentally friendly electronics (e.g., ENERGY STAR) <sup>14</sup>
  - ☐ Recycled products
  - ☐ Avoid use of pesticides where feasible and follow EPA's Integrated Pest Management <sup>15</sup>

## GENERAL ON-SITE OPERATIONS (continued)

- **Encourage sustainable practices by individuals**



- ☐ Minimize waste 16
- ☐ Reuse or recycle waste
- ☐ Protect and conserve water
- ☐ Use alternative fuel vehicles (Hybrid-Electric Vehicles, biodiesel, low-sulfur diesel, ethanol)
- 17 ☐ Carpool 18
- ☐ Schedule activities efficiently so as to minimize travel to and from the site

## FIELD INVESTIGATIONS

### ▪ Mobilization

- ☐ Use fuel-efficient / alternative fuel vehicles and equipment 17
- ☐ Use existing roadways where available
- ☐ Avoid environmentally sensitive areas and cutting native trees/vegetation when placing trailers and storage areas, and while building access
- ☐ Provide for erosion and sediment control to minimize runoff into environmentally sensitive areas
- ☐ Use recycled material for building roadways 19, 20, 21
- ☐ Revegetate areas if necessary

### ▪ Demolition of on-site structures

- ☐ Minimize demolition of structures and buildings
- ☐ Recycle demolition and construction material if applicable 19, 20, 21

### ▪ Field Screening

- ☐ Use non-invasive technologies where possible for subsurface characterization to minimize wastes (Electrical Resistivity Tomography, Borehole Radar Tomography, Ground Penetrating Radar, Seismic Refraction/Reflection, Electromagnetic Survey). 22, 23, 24
- ☐ Incorporate systematic planning, dynamic work strategies, and real-time measurements into work plans (TRIAD) to promote efficiency in remedial investigations. 25
  - ☐ Minimize number of field mobilizations
  - ☐ Minimize number of samples sent to laboratories
  - ☐ Use of mobile laboratories
  - ☐ Use of alternate fuel sources

### ▪ Drilling

- ☐ Have idle reduction policy and idle reduction devices installed on machinery 26
- ☐ Use ultra low sulfur diesel or fuel-grade biodiesel as fuel 27, 28, 29, 30, 31
- ☐ Use retrofitted/new diesel engines with particulate filters and oxidation catalysts installed 32

### ▪ Drilling (continued)

- ☐ Engine Maintenance 33
  - ☐ Perform routine inspections
  - ☐ Conduct preventative maintenance

- ☐ Give problems immediate attention
  - ☐ Perform routine cleaning
  - ☐ Use environmentally friendly lubricants if applicable
- ☐ Decontamination
  - ☐ Place decon station away from environmentally sensitive areas
  - ☐ Use secondary containment to avoid cross contamination
  - ☐ Use steam cleaning where allowed by federal/state/or local regulations
  - ☐ Use non-phosphate detergents
- ☐ Well Installation
  - ☐ Use recycled well materials where possible (well caps, etc.)
  - ☐ Manage use of cement/grout to minimize waste produced
  - ☐ Ensure wells are properly developed to increase efficiency
- ☐ Waste Management
  - ☐ Use direct-push rig if applicable to minimize drill cuttings
  - ☐ Place drill cuttings back in boring if applicable
  - ☐ Store drill cuttings away from surface water bodies to prevent cross-contamination
  - ☐ Dispose of drill cuttings at recycling facility if possible
- **Sampling**
  - ☐ General practices
    - ☐ Use environmentally friendly PPE if applicable
    - ☐ Use recycled laboratory containers if applicable
    - ☐ Use laboratories which promote green chemistry
    - ☐ Schedule sampling to minimize field visits and shipping
    - ☐ Consider all data needs for any potential future uses
  - ☐ Soil Sampling
    - ☐ Use sampling methods that require smaller amounts of soil to minimize waste
    - ☐ Dispose of waste properly to avoid cross contamination
    - ☐ Recycle soil waste if available
- **Sampling (continued)**
  - ☐ Groundwater sampling
    - ☐ Use passive groundwater samplers where applicable <sup>34, 35</sup>
    - ☐ Use eco-friendly bailers <sup>36</sup>
    - ☐ Use dedicated equipment to minimize waste and cross-contamination
    - ☐ Use remote data collection to minimize mobilizations

- ☐ Treat and recycle purged water on-site
- ☐ Surface Water sampling
  - ☐ Choose sampling locations that minimize ecological disturbance
  - ☐ Use dedicated sampling equipment to minimize waste and cross-contamination
  - ☐ Decontaminate equipment away from surface water body to avoid contamination due to runoff

## TREATABILITY INVESTIGATIONS/FEASIBILITY STUDIES

### ▪ Treatability Investigations (Bench-Scale, Pilot-Scale)

- ☐ The evaluation of laboratory sub-contractors should include their commitment to green chemistry. The purpose is to reduce the amount and toxicity of chemicals used and required to be disposed. <sup>37, 38</sup>

### ▪ Analysis of Alternatives in the FS and Green Remediation Best Management Practices (BMPs)

- ☐ Evaluate "net environmental benefit as part of the nine criteria review process" <sup>2</sup>
  - ☐ Consider future use of site in determining the short and long-term effectiveness of the remedy
  - ☐ If one remedy has a vendor within the state but another remedy will require shipping equipment from another region, then the first remedy is more easily implementable AND may have a lower environmental footprint (through reduced transportation).
  - ☐ Incorporate green remediation best practices for each remedy considered as part of cost evaluation
- ☐ Evaluate energy efficiency (amount of energy necessary to remove one pound of contaminant) of each alternative over the projected lifecycle of the alternative. <sup>2, 39</sup>
  - ☐ Incorporate green remediation best practices for each remedy considered as part of cost evaluation
  - ☐ Analyze the feasibility of alternate energy sources for the required energy, e.g., solar, wind, biodiesel, etc
  - ☐ Evaluate low-energy remedial alternatives, e.g., MNA, phytoremediation, micro-bioremediation, etc.; low energy use will be one of the factors weighed against the projected time for remediation
  - ☐ Assess the best estimate of the cost of the energy projected out 30 years

### ▪ Analysis of Alternatives in the FS and Green Remediation Best Management Practices (BMPs) (continued)

- ☐ Evaluate water intensity (amount of water necessary to remove one pound of contamination) <sup>2</sup>
  - ☐ Focus on minimizing high quality fresh water use
  - ☐ Assess the use of reclaimed water where applicable, e.g., for irrigation
  - ☐ Use native vegetation that requires little or no irrigation
- Minimize use of fertilizer, pesticides, herbicides, and other chemicals to prevent nutrient loading and toxicity impacts to nearby water bodies

- ┐ Evaluate soil intensity of each alternative (amount of soil necessary to be displaced or disturbed to remove one pound of contaminant)<sup>2</sup>
- ┐ Evaluate material intensity of each alternative (amount of raw materials extracted, processed, or disposed for each pound of contaminant treated)<sup>2</sup>
- ┐ Consider Green Remediation Best Management Practices for site restoration
  - ┐ Low-Impact Development (LID) - stormwater management <sup>40</sup>
  - ┐ Ecorestoration (increased wildlife habitat, increased carbon sequestration, protection of water resources, etc).
  - ┐ Greenscaping <sup>41</sup>
  - ┐ Encourage development of renewable energy production facilities on contaminated land

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